DRAFT

2022 MCCC Annual Report (working rough draft)

Commented [1]: Unformatted review draft. Commission is deliberating on recommendations through separate discussion document.

Letter from the Chair and Co-Chairs

Climate change offers the unique opportunity to nurture a future that minimizes worst case scenarios while designing communities that harmonize with natural systems. Forests, farms, wetlands, and streams all offer services that manage more intense rain and dampen heat while cleaning air and water.

> Even though the future seems far away, it is actually beginning right now.
>
> –Mattie Stepanek
> poet, peacemaker and philosopher who played

The work of building a better future starts by recognizing that historic inequities increase vulnerability unevenly. By prioritizing equity in decision making, the Maryland Commission on Climate Change (MCCC) works to build communities that are safe, healthy, and thriving in a changing climate.

This 2022 report of the MCCC highlights a year of tremendous achievement. Maryland is a national climate leader turning ambitious ideas into transformative action. The independent Commission, in collaboration with state and federal agencies, elected leaders, stakeholders, advocates and the public, guided Maryland to exceed its 2020 goal to reduce greenhouse gas emissions 25% from 2006 levels. Maryland, not only achieved this goal, but surpassed it by achieving a 30% reduction by 2020.

Moving forward, new greenhouse gas reduction goals for Maryland target a 60% reduction below 2006 levels by 2031 and net-zero emissions by 2045. In response, the MCCC deliberated and proffered the ambitious recommendations found in this annual report. The recommendations represent a set of steps needed to achieve new emission reductions and includes rapidly accelerating the transition to zero-emissions vehicles, reducing vehicle miles traveled, constructing more clean power generation in state, and prioritizing building decarbonization. This annual report provides a framework to support rural, urban, and suburban communities' transition to a more resilient future.

The MCCC is a venue for honest debate yielding collaborative, innovative policies while expanding Maryland's global leadership with equitable solutions to reduce greenhouse gas emissions, protect communities, and expand the state's economy for current and future generations.Each volunteer member of the MCCC has worked many hours to advance the charge to mitigate the causes of, prepare for, and adapt to the consequences of climate

change. As Chair and Co-Chairs, we are humbled to serve with exceptional colleagues on the MCCC and in its working groups.

The recommendations in this report offer a starting point to accomplish emission and resilience goals. Our overall goal is to see in a changing climate, future generations can live in thriving, equitable communities with clean air, water, and land. We can all work towards a better tomorrow.

(Signatures/pics of Chair/Co-chairs to be inserted here)

Introduction

The Maryland Commission on Climate Change (MCCC or the Commission) was established to advise the Governor and the Maryland General Assembly (MGA) on strategies for reducing greenhouse gas (GHG) emissions and deliberating science-based, equitable recommendations to combat the impacts of climate change on the State. Since 2007, the Commission has played a fundamental role in Maryland's efforts to fight climate change. One of the most significant roles of the Commission is to serve in an advisory capacity to the Maryland Department of Environment (MDE) and other state entities. The Commission is comprised of a diverse set of stakeholders, policymakers, business representatives, advocates, and citizens who recommend programs and policies aimed at mitigation, adaptation, and resiliency in response to climate change. The Commission has proven that it is possible to have responsible debates and build consensus on how best to protect our natural resources, promote clean energy, and grow our economy for current and future generations. The Commission is committed to helping Maryland find bipartisan, common sense solutions to the problems facing the state. This set of recommendations is the key deliverable, produced for the Governor and the MGA, as the result of the annual meetings of the Commission process.

This past year, the MCCC worked hard to identify policy and potential funding gaps in the state's GHG reducing programs, in addition to implementation measures that have been slow to start. The MCCC working groups provided numerous recommendations to inform and develop a strategy to implement the requirements in the Climate Solutions Now Act (CSNA) including the requirement that MDE create a plan in 2023 to reduce GHG emissions 60% by 2031.

Figure 1 (below) illustrates both our 60% by 2031 gross emissions goal and our net zero emissions goal for 2045.

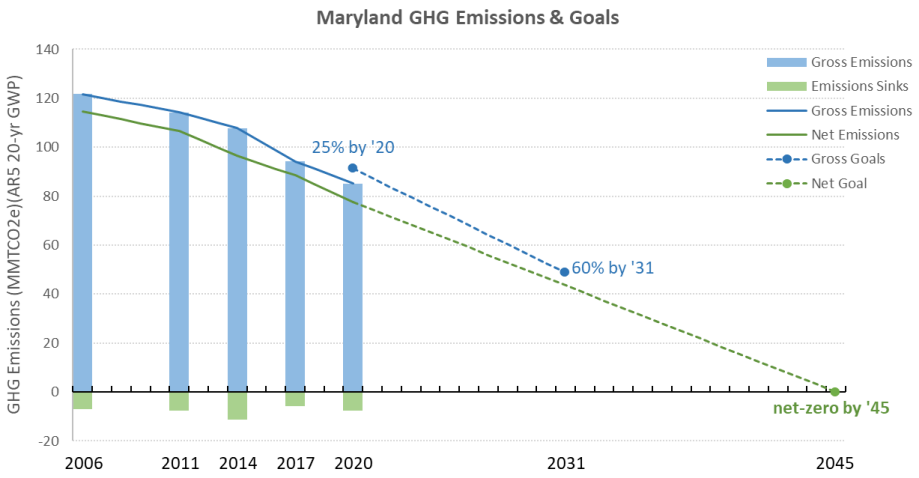

Figure 1: Maryland's historic GHG emissions and sinks (bars), and CSNA goals (lines).

The updated GHG reduction goals also include a requirement that MDE use a new GHG accounting methodology, switching from the IPCC standard 100-year global warming potential (GWP) to the 20-year GWP, which accounts for the higher impact of short-lived climate pollutants like methane over shorter time periods.

Figure 2 (below) illustrates the impact of shifting from the 100-year to 20-year GWP, and the gap between projected and target GHG emission levels in 2031. If the 2030 GGRA Plan published by MDE last year were fully implemented, then the state would need to find an additional 19.7 million metric tons of carbon dioxide equivalent (MMTCO2e) reduction - or an additional 16% reduction in statewide GHG emissions from 2006 levels by 2031 to meet the goal for that year.

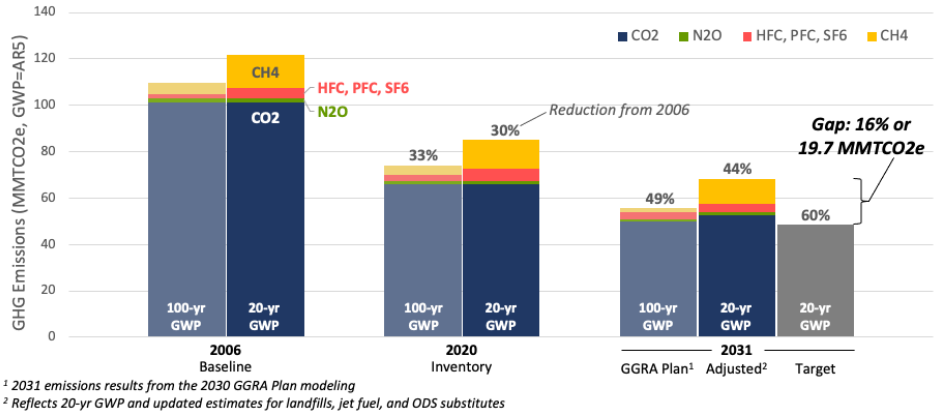

Figure 2: Maryland historic emissions, projected emissions, and emissions gap.

The aim of the MCCC's work this year was to approach the ambitious 60% target from a new angle, one that focused on implementation of a suite of existing policies and programs that are necessary to meet the 60% target.

Over the course of 2022, the Commission's working groups undertook diverse efforts to not only develop, but actively engage in activities to pursue the body's specific statutory charges while ensuring that environmental and climate justice considerations are integrated across its work and recommendations. As directed, the MCCC provided oversight for the Manufacturing sector decarbonization strategies and impact in the state of Maryland study which was published in October. The Commission's working groups heard from experts on topics including, electrification of transportation, Electric Vehicle (EV) infrastructure, reducing vehicle miles traveled, renewable and clean energy efforts and issues, energy efficiency, and just transition. In addition, natural solutions to climate change, including carbon sequestration from forests and healthier soils; and long and short-term climate resiliency and coastal hazard mitigation were discussed. Below are brief summaries of the working groups' accomplishments:

In the Adaptation and Resiliency Working Group (ARWG), work continues on several initiatives. Progress has been made by the State Agency Saltwater Intrusion Team and through the Targeted Resilience Area project. The Maryland Department of Agriculture's Soil Health Advisory Committee approved recommendations to advance practice adoption through Maryland's Healthy Soils Program. Also, the state submitted an addendum to address additional load reductions required for Integrating Climate Change into the Phase III Watershed Implementation Plan in order to meet Total Maximum Daily Load endpoints by 2025.

The Education, Communication and Outreach Working Group (ECO) reports accomplishments this year in all focus areas: education, communication, and outreach. ECO developed a logo for

the Commission (first one) as well as cover and layout for the 2022 Annual Report. ECO secured speaking opportunities for Commission leadership on state and national levels. The ECO working group also advertised and hosted three public webinars in our series: Climate Talk: The Climate Solutions Now Act, The 2021 Annual Report and Recommendations for Climate Action, and The Growth of ESG. ECO plans to produce an annual webinar for the Commission annual report henceforth every December, starting in 2022.

The Mitigation Working Group (MWG) focused its attention in 2022 on decarbonizing the transportation sector, which is the largest source of GHG emissions in Maryland (and the nation). Several of the MWG's policy recommendations this year exemplify this focus. The MWG also ran a Biomass to Energy Subgroup, which developed recommendations for modifying the thermal renewable energy program within the state's Renewable Portfolio Standard. Later in 2022, the MWG will launch a new subgroup to further develop recommendations for accelerating the transition to light-duty zero emissions vehicles. That subgroup aims to have recommendations ready for the MWG in early 2023.

The Scientific and Technical Working Group (STWG) tracks recent scientific and engineering literature relevant to the work of MCCC. The final synthesis report of the Intergovernmental Panel on Climate Change (IPCC) 6th Assessment report (AR6) will be published at the end of the year, but STWG have tracked and provided summary reports of the IPCC working groups and special reports contributing to AR6. Relevant webinars and other literature are tracked through STWG meeting reports. Activities also include the completion of a webinar series on *'Blue Carbon'* and a report on the potential for carbon sequestration in Maryland's tidal marshes (with ARWG), contributions to the update of Maryland's Ocean Acidification Plan, and technical support of the Saltwater Intrusion Plan.

The Climate Justice team continued its efforts to ensure equity is considered in the work undertaken by the MCCC's Work Groups. As such, the team's liaisons represented the interest of communities that are under-resourced, overburdened, and disproportionately impacted by climate change. The Climate Justice team emphasized, where appropriate, the need for applying tools that would target resources in proportion to the need and measure and track outcomes. Finally, the Climate Justice team continues to seek opportunities for meaningful collaboration with community stakeholders and advocates to leverage their expertise as well as to identify solutions that address the financial, economic, and health burdens driven by climate and its harmful impacts.

Programs and recommendations not addressed in 2022 will be included in each working group's 2023 work plans and will be considered by the Commission in the coming year.

Federal actions, including funding from the Inflation Reduction Act, may help the state implement select 2030 GGRA Plan measures, but the state will need to develop and implement significantly more stringent measures over the next 8 years to achieve the 2031 goal. The Infrastructure Investment and Jobs Act will also help support Maryland's goals when used to

fund low carbon transportation options such as public transit, bike, pedestrian infrastructure, and transit-oriented development programs.

Through this report, the Commission offers a series of recommendations to the Governor and MGA to enhance the state's efforts in climate change mitigation, adaptation, and resilience, to better incorporate environmental and climate justice into the state's climate approach. The Commission is dedicated to ensuring that policy recommendations consider impacts to all people, especially those who have historically been marginalized and overburdened. The recommendations following will help Maryland continue to protect the economy, the environment, and the health of all of its residents.

Policy Recommendations

[under deliberation by MCCC – see accompanying discussion draft of working group recommendations]

Science Update:

Findings of the Intergovernmental Panel on Climate Change (IPCC)

During 2022 the Intergovernmental Panel on Climate Change released the final two of three working group reports of its Sixth Assessment (AR6), these on Impacts, Adaptation and Vulnerability and Mitigation of Climate Change. When the first report on the Physical Science Basis was released in 2021, it was described by UN Secretary-General António Guterres as a *code red for humanity,* an atlas of human suffering and a damning indictment of failed climate leadership.

Selected IPCC scientific findings include:

- It is unequivocal that human influence has warmed the atmosphere, ocean, and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere, and biosphere have occurred.
- Continued global warming is projected to further intensify the global water cycle, including its variability, global monsoon precipitation, and the severity of wet and dry events.
- GHG emissions are continuing to increase. For a 67% chance of limiting global warming to 1.5ºC, it is necessary to limit carbon emissions to 400 gigatonnes of carbon dioxide. This is 10 years of emissions at 2020 levels.
- Current National Determined Contributions that set GHG Reduction Targets will result in 2.4ºC increase in global temperature by 2100. Current levels of emissions will result in a 2.7ºC increase.
- 40% of the world population is highly vulnerable to the effects of climate change.

- Environmental justice issues will be exacerbated at the national, regional, and local levels.
- Technology is important, but there will be no single magic fix. For example, machines for direct carbon capture may emit a good percentage of the extracted carbon if there is no clean energy source to power the process.
- The worst effects of climate change can be avoided and global warming limited to the 1.5°C threshold if concerted and significant action is taken now.
- Low emissions technology is becoming more affordable.These findings are supported by a recent publication, economists predict that a fast transition from fossil fuels to green energy could result in global savings of $12 trillion.[1]

Relevance of IPCC Findings to Maryland

Maryland can expect continuing severe chronic and periodic impacts of climate change, including:

- Increases in extreme precipitation in our region (very likely)
- Expected increase in river and pluvial flooding (medium confidence)
- Expected greater incidence of heat waves (virtually certain)[2] [3]
- Economic impact of weather and climate related disasters will continue to escalate[4]. (Table 1 provides evidence of the recent costs to Maryland)
- Tidal waters will continue to rise faster depending on the level of global warming
- Exacerbated air quality and environmental justice problems due to climate change including higher temperatures
- Climate change is physically changing the Chesapeake Bay ecosystem and will influence recovery efforts, potentially including the effectiveness of best management practices being implemented to reduce nutrient and sediment loading. This is the subject of assessments by Maryland's agencies and the Chesapeake Bay Program.

[1] Way, R., Ives, M. C., Mealy, P., & Farmer, J. D. (2022). Empirically grounded technology forecasts and the energy transition. Joule, 6(9), 2057–2082. doi.org/10.1016/j.joule.2022.08.009.

[2] Refer for example to: riskfactor.com/

[3] firststreet.org/press/press-release-2022-heat-model-launch/

[4] https://www.climate.gov and NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2022). ncei.noaa.gov/access/billions/, DOI: 10.25921/stkw-7w73

Select Time Period Comparisons of Maryland Billion-Dollar Disaster Statistics (CPI-Adjusted)

Time Period	Billion-Dollar Disasters	Events/Year	Cost	Percent of Total Cost
1980s (1980-1989)	7	0.7	$1.0B-$2.0B	11.2%
1990s (1990-1999)	13	1.3	$2.0B-$5.0B	17.5%
2000s (2000-2009)	10	1.0	$2.0B-$5.0B	25.9%
2010s (2010-2019)	27	2.7	$5.0B-$10.0B	38.9%
Last 5 Years (2017-2021)	19	3.8	$2.0B-$5.0B	13.8%
Last 3 Years (2019-2021)	11	3.7	$500M-$1.0B	6.2%
Last Year (2021)	5	5.0	$250M-$500M	2.5%
All Years (1980-2022)*	**70**	**1.6**	**$10.0B-$20.0B**	**100.0%**

**Statistics valid as of October 11, 2022*

Table: Increasing incidence and damages due to climate and weather-related disasters in Maryland[4]. *[Consumer Price Index (CPI) adjusted for 2022]*

Sea Level Rise in Maryland

Sea-level rise accelerated by climate change has been a key concern for Maryland with its thousands of miles of tidal shoreline and low lying coastal and urban areas. Under the auspices of the MCCC, projections of future sea-level rise in Maryland were developed in 2008, 2013, and 2017. Over that time, scientific understanding of sea-level rise as a global phenomenon has advanced greatly, particularly with regard to: the sources contributing to it, contributions of melting glaciers and polar ice sheets, the rate of recent acceleration, and why sea level rises at higher rates in some parts of the ocean. This emerging understanding was taken into account in the development of new projections of sea-level rise under different emissions pathways in the IPCC's Sixth Assessment. While about half a foot of sea-level rise will occur by 2050, even if the world achieves net-zero greenhouse emissions by that time, continued growth in emissions would dramatically accelerate sea-level rise later this century and beyond. Global warming in excess of 2°C greatly increases the risk of rapid loss of ice from Antarctica and Greenland, potentially raising sea level by as much as 8 feet over the next 100 years. Recent research shows that certain thresholds of sea level rise are inevitable; however, the actual sea level rise experienced depends on the actions taken in the coming decades. The University of Maryland Center for Environmental Science will update sea-level rise projections for Maryland in 2023 based on the proven Sea Level Projection Tool developed by National Aeronautics and Space Administration using the IPCC projections.